REMARKS

Claims 11-15 and 18-21 were previously pending in the application. This Amendment adds new claim 22. Claims 11-15 and 18-21 remain unchanged. Claims 11 and 21 are independent.

The Provisional Non-Statutory Double Patenting Rejection

Claims 11 and 12 provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 11 and 12 of co-pending Application No. 10/583,636.

The Office Action alleges that, although the conflicting claims are not identical, they are not patentably distinct from each other because both applications are claiming the same capacitive level sensor, however it allegedly is well within the skill level to mount the specific level sensor to have met the limitations of both applications.

Applicants respectfully traverse this rejection.

Independent claim 11 recites wherein the at least one sensor probe is arranged such that it is separated with respect to an active sensor surface of the filling level sensor by a wall of the washing container. Claims 11 and 12 of co-pending Application No. 10/583,636 do not recite this feature.

Thus, claims 11 and 12 of the present application are not coextensive in scope with claims 11 and 12 of co-pending Application No. 10/583,636. Moreover, the Office Action has not established any reasonable basis for how the features of claim 11 would have been obvious from claim 11 of the co-pending application.

Applicants respectfully request withdrawal of this rejection.

The Claimed Invention

An exemplary embodiment of the claimed invention, as recited by, for example, independent claim 11, is directed to a dishwasher comprising a system for recognition of the fluid level of the washing fluid contained in the dishwasher, the fluid level

recognition system having at least one capacitive filling level sensor having at least two probes, forming two capacitor plates, each operatively coupled to a sensor surface and projecting into the washing container for operative contact with the washing fluid, thereby using the washing fluid as a dielectric having a dielectric constant that changes with the fill level of the washing fluid, wherein at a first fill level the probes and the washing fluid form a capacitor having a first capacitance value indicating a first fill level and causing the filling level sensor to sense the first fill level and at a second fill level the probes and the washing fluid form a capacitor having a second capacitance value indicating a second fill level and causing the filling level sensor to sense the second fill level, wherein at least one sensor probe made of electrically conducting material is provided inside the washing container and an electromagnetic field can be formed between the sensor probe and the filling level sensor, wherein the electromagnetic field varies depending on the height of the liquid level or varies depending on the dielectric constant of the medium surrounding the sensor probe, and wherein the at least one sensor probe is arranged such that it is separated with respect to an active sensor surface of the filling level sensor by a wall of the washing container.

In this manner, the present invention provides a dishwasher with a system for filling level recognition which reliably determines the fluid level in the dishwasher without using moving parts and merely by using electronic components. As a result, the system for recognition of fluid level according to the invention is largely not liable to wear and contamination by deposited food residues. Since space no longer needs to be taken into account for mechanical devices, another advantage of the system for recognition of fluid level according to the invention is that it only requires a very small amount of space and thus can be accommodated almost arbitrarily even in inaccessible locations in the dishwasher. The system according to the invention further allows non-contact filling level recognition where the rinsing liquid and the filling level sensor do not come into contact, which will be explained in detail in the following description.

The Rejection under 35 U.S.C. § 103

In the Office Action, claims 11-15 and 18-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Wennerberg et al reference (US. 3,539,153) in view of the Adamski et al reference (U.S. 4,982,606).

Applicants respectfully traverse this rejection.

None of the applied references discloses or suggests all of the features of independent claim 11. As explained above, these features are important for providing a dishwasher with a system for filling level recognition which reliably determines the fluid level in the dishwasher without using moving parts and merely by using electronic components, which is largely not liable to wear and contamination by deposited food residues, and which only requires a very small amount of space and thus can be accommodated almost arbitrarily even in inaccessible locations in the dishwasher. The system according to the invention further allows non-contact filling level recognition where the rinsing liquid and the filling level sensor do not come into contact.

The Wennerberg et al reference very clearly does not teach or suggest these features. Instead, the Wennerberg et al reference discloses three separate sensors (e.g., a low level sensor 26, a medium level sensor 28, and a high level sensor 30) that may be one of several types of sensors. The Wennerberg et al reference discloses that the sensors 26, 28, 30 can be capacitive sensors. Indeed, the Office Action specifically acknowledges that the Wennerberg et al reference discloses using multiple sensors for determine the height, not a single sensor.

In stark contrast to the teachings of the Wennerberg et al reference, in the claimed invention, the same probes are used in conjunction with the washing fluid to form a capacitor that has a first capacitance value indicating a first fill level and a second capacitance value indicating a second fill level. For example, as shown in Figure 1, the same probes 8 of the present invention contact the washing fluid to form a capacitor having a first capacitance value indicating a first fill level and causing the filling level sensor to sense the first fill level, and at a second fill level the probes 8 and the washing

fluid form a capacitor having a second capacitance value indicating a second fill level and causing the filling level sensor to sense the second fill level.

Thus, the Wennerberg et al reference very clearly does not disclose or suggest these features.

The Adamski et al reference does not remedy the deficiencies of the Wennerberg et al reference. Indeed, contrary to the assertions in the Office Action, the Adamski et al reference clearly fails to teach or suggest wherein the at least one sensor probe is arranged such that it is separated with respect to an active sensor surface of the filling level sensor by a wall of the washing container, as recited in claim 11.

With reference to the exemplary embodiment shown in the Figure of the present invention, independent claim 11 recites a capacitive filling level sensor (e.g., 4) having at least two probes (e.g., 8) forming two capacitor plates. The probes 8 are each operatively coupled to the sensor (e.g., 4) and project into the washing container for operative contact with the washing fluid. At least one of the sensor probes (e.g., 8) is arranged such that it is separated with respect to an active sensor surface (e.g., 10) of the filling level sensor (e.g., 4) by a wall (e.g., 2) of the washing container. That is, the sensor probe (e.g., 8) is arranged on the side of the wall (e.g., 2) that is opposite to the active sensor surfaces (e.g., 10). Consequently, the active sensor surfaces (e.g., 10) and the filling level sensor (e.g., 4) are disposed on the "dry" side on the wall (e.g., 2) of the washing container, whereas the sensor probes (e.g., 8) are located directly opposite the active sensor surfaces 10 of the filling level sensor (e.g., 4) on the side of the wall (e.g., 2) of the washing container flushed with washing fluid and thus in the interior of the washing container. In this manner, the active sensor surface (e.g., 10) and the filling level sensor (e.g., 4) can be protected from wear and contamination by the washing fluid, deposited food residues, detergents, etc., thereby ensuring reliable and permanent functioning of the system for filling level recognition. See, e.g., pages 6-7, paragraphs [0023] - [0024].

In stark contrast to the claimed invention, the Adamski et al reference discloses a liquid level sensor 48 having first and second sensor plates 50, 52 (compared by the Office Action to the claimed sensor probes projecting into the washing container for

operative contact with the washing fluid). The liquid level sensor 48 is vertically mounted to tub 12 with bracket 49, as shown in Figure 1.

The Adamski et al reference further discloses:

> Mounted on top of first and second plates 50 and 52 is circuit board 76. Mounted on circuit board 76 is frequency generation circuitry 42 including LM555 timer 78 and associated circuitry 96, 100 and 106 (shown in FIG. 4). Rivets 74 are driven through the circuit board 76 into the rivet hole 68 on the top of first and second plates 50 and 52. The rivets 74 provide an electrical contact *for connecting the first and second plates 50 and 52* ***directly*** *to circuit board 76*. By riveting the circuit board 76 to first and second plates 50 and 52, the distance between the level sensor 48 and the frequency generation circuitry 42 is small. Further, there are no wires connecting the level sensor 48 to the frequency generation circuitry 42, which can move during washing machine 10 operation. Accordingly, the stray capacitance between the first and second plates 50 and 52 and circuit board 76 is minimized.
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> See col. 5, lines 27-43.

In stark contrast to the present invention and contrary to the assertions in the Office Action (at pages 4-5, bridging paragraph), the Adamski et al reference clearly teaches that the circuit board 76 is connected *directly* to the alleged probes 50, 52. The Adamski et al reference clearly fails to disclose or suggest that the at least one sensor probe is arranged such that it is separated with respect to an active sensor surface of the filling level sensor by a wall of the washing container, as recited in claim 11. As shown in Figure 1, the sensor 48 is arranged in a vertical manner inside the washing container and extends down into the washing liquid in the washing container. Contrary to the assertions in the Office Action, the Adamski et al reference does not disclose or suggest that any part of the sensor is separated by or behind a wall of the washing container. Indeed, col. 5, lines 10-65, of the Adamski et al reference (which is cited by the Office Action to support this assertion) is completely silent with respect to separating any part of the sensor by a wall of the washing container.

Furthermore, the Adamski et al reference explicitly states that the sensor is located in the container. For example, the Adamski et al reference describes "a liquid level sensor … in a washing machine container" and "a liquid level sensing apparatus and controller that changes the amount of liquid in the container where the sensor is located in response to the changes of capacitance between the probes of the sensor. See col. 2, lines 50-54; emphasis added.

For at least these reasons, the Adamski et al reference clearly fails to disclose or suggest that the at least one sensor probe is arranged such that it is separated with respect to an active sensor surface of the filling level sensor by a wall of the washing container, as recited in claim 11. The Adamski et al reference does not remedy the deficiencies of the Wennerberg et al reference.

Moreover, the Adamski et al reference clearly would not suggest to one of ordinary skill in the art separating the active sensor surface of the filling level sensor by a wall of the washing container in order to protect the sensor element from interacting with water. Instead, as very clearly shown in Figure 3, the Adamski et al reference teaches protecting the first and second plates 50, 52 from corrosion and exposure to soap film by coating the plates 50, 52 with a non-corrosive material 54 having a dielectric constant and total thickness that are small enough so as not to affect the capacitance between the first and second plates 50, 52. See, e.g., col. 5, lines 53-65.

Thus, at best, the Adamski et al reference clearly would suggest to one of ordinary skill in the art to provide a sensor in the washing container and having plates 50, 52 coated with a non-corrosive material 54 in order to protect them from corrosion and exposure to soap film in the washing container.

Furthermore, when considered as a whole, Applicants respectfully submit that the Adamski et al reference clearly teaches away from the present invention, and hence, does not render the claimed invention obvious.

First, as explained above, the Adamski et al reference teaches that the circuit board 76 should be mounted *directly* to the top of first and second plates 50 and 52 in order to (1) reduce the distance between the level sensor 48 and the frequency generation

circuitry 42, (2) eliminate any wires connecting the level sensor 48 to the frequency generation circuitry 42, which can move during washing machine 10 operation, and (3) minimize the stray capacitance between the first and second plates 50 and 52 and circuit board 76. The teaching of a direct connection clearly would teach away from separating the active sensor surface from the filling level sensor by a wall of the washing container.

Second, as explained above, the Adamski et al reference teaches that the first and second plates 50, 52 can be protected from corrosion and exposure to soap film by (1) vertically mounting the sensor 48 to the tub 12 with a bracket 49, as shown in Figure 1, and (2) coating the plates 50, 52 with a non-corrosive material 54 having a dielectric constant and total thickness that are small enough so as not to affect the capacitance between the first and second plates 50, 52. See, e.g., col. 5, lines 53-65.

The teaching of coating the plates 50, 52, which are directly connected to the circuit board 76, in order to prevent corrosion, etc., clearly would teach away from arranging the at least one sensor probe that it is separated with respect to an active sensor surface of the filling level sensor by a wall of the washing container, thereby protecting the active sensor surface of the filling level sensor from wear and contamination by the washing fluid, deposited food residues, detergents, etc., recited in claim 11.

Thus, the features of claim 11 clearly would not have been obvious from the alleged combination of the Wennerberg et al reference and the Adamski et al reference

Applicants respectfully request withdrawal of this rejection.

New Claim 22

New claim 22 is added. No new subject matter is added. See, e.g., page 7, lines 7-14, paragraph [024].

Applicants respectfully submit that claim 22 is patentable over the applied references for somewhat similar reasons as those set forth above.

For example, claim 22 recites wherein the at least one sensor probe that is provided inside the washing container is disposed on a first side of the wall of the washing container, the first side being exposed to the washing fluid, and wherein the

active sensor surface of the filling level sensor is located outside the washing container and on a second, opposite side of the wall of the washing container, the second, opposite side being isolated from exposure to the washing fluid by the wall of the washing container.

As explained above, the Adamski et al reference clearly teaches that the circuit board 76 is connected *directly* to the alleged probes 50, 52. The Adamski et al reference does not disclose or suggest that any part of the sensor is separated by, or behind, a wall of the washing container.

Applicants respectfully request allowance of claim 22.

CONCLUSION

In view of the above, entry of the present Amendment and allowance of claims 11-15 and 18-22 are respectfully requested. If the Examiner has any questions regarding this amendment, the Examiner is requested to contact the undersigned. If an extension of time for this paper is required, petition for extension is herewith made.

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